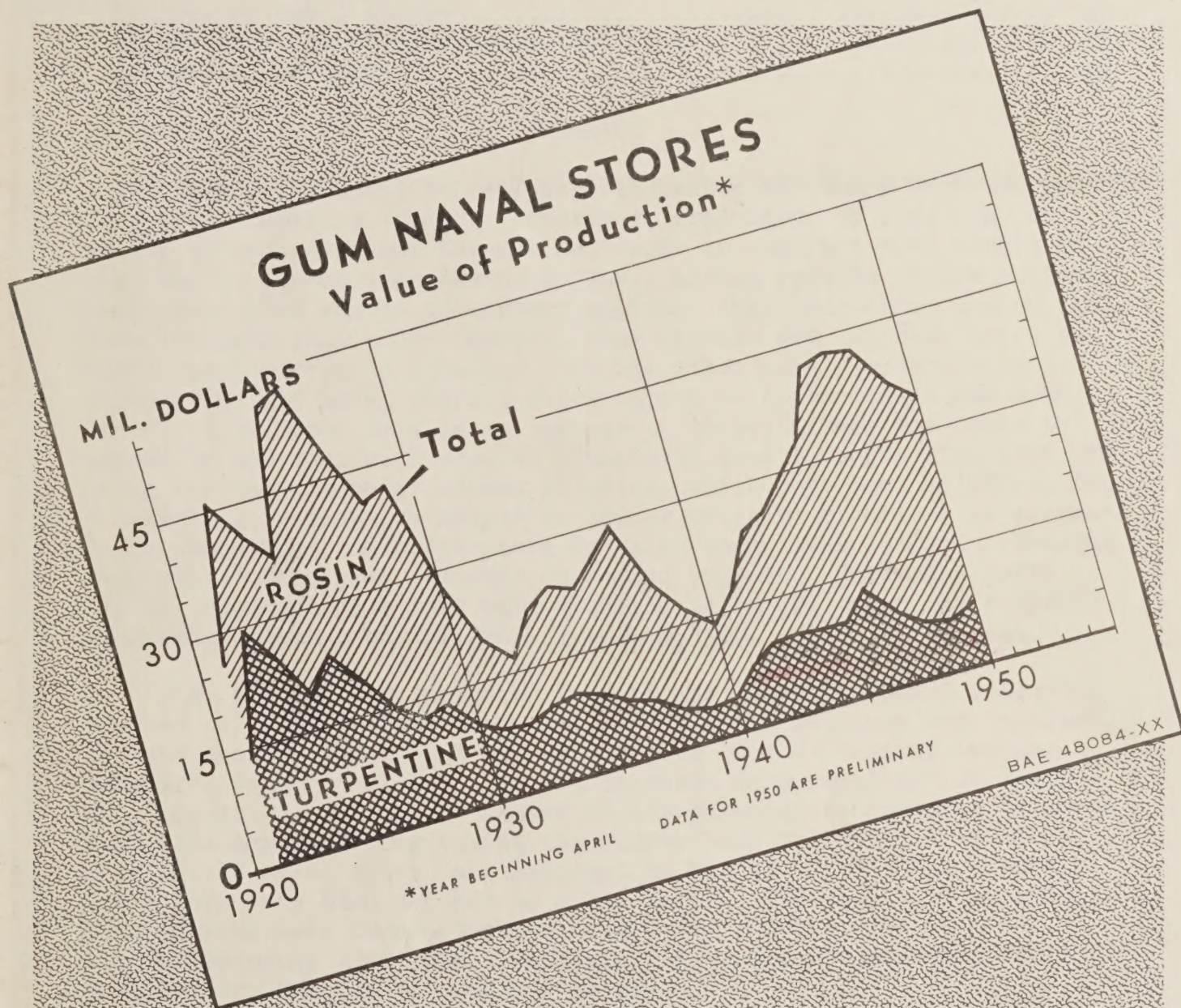
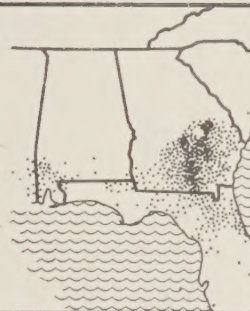




Review and Outlook NAVAL STORES



UNITED STATES DEPARTMENT OF AGRICULTURE
2 U.S. BUREAU OF AGRICULTURAL ECONOMICS
WASHINGTON, D. C.
APRIL 1951



REVIEW AND OUTLOOK

NAVAL STORES INDUSTRY

Approved by the Outlook and Situation Board, April 4, 1951

CONTENTS

	<u>Page</u>
Summary	1
Outlook for Rosin	2
Outlook for Turpentine	4
Recent Government Action	5
Historical Background	10
Sources of Naval Stores	10
Trends in Production, Exports, and Uses	12
Government Programs	16

SUMMARY

Prices of naval stores have fluctuated violently over the past 50 years. Contrary to most industries, production of pine gum, the source of gum rosin and turpentine, tends to contract when demand is high and to expand when demand is low. During periods of low national employment, the supply of workers expands, thus increasing production. When business conditions improve, some farmers and laborers shift to better paying jobs in industry. On the other hand, production of steam distilled naval stores, which is not as dependent as gum upon labor, is affected to a lesser extent by these factors and tends to expand or contract with demand. Commodity Credit Corporation loan programs for the gum naval stores industry, which have been in effect for the last 13 years, have helped to reduce price fluctuations by accumulating stocks during those years in which demand was low and releasing these into commercial channels as demand expands. Following World War II, substantial stocks were accumulated by CCC under the support programs for the crops of 1947, 1948 and 1949.

As a result of increased foreign and domestic demand following the war in Korea, prices advanced sharply until ceilings were applied in late January, 1951, and are expected to hold at ceiling levels. Effective January 30, 1951, export licenses were required for rosin and turpentine. These are needed to assure adequate supplies to cover essential domestic uses during the current and following crop years. Supplies of naval stores are expected to become increasingly tight. CCC stocks have been reduced to a low level. CCC stocks of rosin on April 1 were less than a 3-month supply for domestic use at the October-December 1950 rate of consumption, while CCC stocks of turpentine were far below a month's supply.

The support level for crude pine gum produced in 1951 has been set at 90 percent of parity as of April 1, compared with 60 percent for the preceding crop. This higher support level would help to stabilize the industry in case of a sudden drop in demand. Despite a higher level for both support and market prices, output of pine gum in 1951-52, and hence of gum rosin and gum turpentine, may be about the same as in the previous season.

Production of wood rosin and turpentine and tall oil may be larger in 1951-52 than a year earlier. The added output of sulphate wood turpentine probably will be entirely absorbed by new insecticides and other industrial uses.

A Federal market news service established in January 1951 provides producers with prices at Southern plants and ports for gum and wood rosin and turpentine and prices paid producers for pine gum delivered at processing plants.

OUTLOOK FOR ROSIN*

BACKGROUND.- Since rosin is an industrial raw material, demand for rosin depends mainly on the rate of industrial production. Production of rosin can be increased only gradually; hence the price of rosin often advances sharply when industrial production increases. When demand drops off, on the other hand, production is reduced relatively slowly, stocks accumulate, and the price usually drops sharply.

The price of gum rosin as quoted on the Savannah Cotton and Naval Stores Exchange declined sharply during the spring of 1950, reaching a low of \$4.92 per hundred pounds (all grades) in June compared with an average of \$6.47 in April 1949-March 1950, the preceding crop year. The CCC loan rate to producers for the 1950-51 output of rosin had been reduced to \$4.77 per hundred pounds compared with \$6.78 a year earlier. Whereas large stocks of rosin had been accumulated by CCC as a result of price-support operations in the 1948 and 1949 crop years, practically no rosin was placed under loan in 1950.

The Korean crisis resulted in a sharp advance in the price of rosin. In March 1951 the Savannah price had risen to \$8.80 per hundred pounds. This advance in price was due not only to rising industrial activity but also to strong demand from industrial users for rosin for building up inventories. Under a general price freeze, prices of rosin were frozen on January 26, 1951 at the highest level received by each seller in the base period (December 19, 1950-January 25, 1951). CCC stocks of rosin were reduced from 744 thousand drums (520 pounds net weight) July 1, 1950 to 311 thousand drums April 1, 1951.

* Readers not familiar with the naval stores industry may wish to refer to the historical background section, beginning on page 10.

Gum Rosin Output to Remain About The Same,
Wood Rosin To Increase In 1951-52

Production of gum rosin in the first quarter (April-June) of the 1950 marketing year was 5 percent smaller than a year earlier; in July-September, 15 percent smaller; and in October-December, 26 percent smaller. However output in the low producing months of January and February totaled somewhat greater than a year earlier. Total output of gum rosin in April 1950-March 1951 may be around 800 thousand drums compared with 925 thousand a year earlier.

Most of the decline in output early in the 1950-51 season apparently was due to adverse weather which retarded the flow of gum. But part of the decline in the 1950-51 total compared with a year earlier was attributable to migration of turpentine farmers and laborers to better paying employment in industry. Following the Korean outbreak, labor was actively recruited for reopening and reconditioning army training camps in the Southeast. The atomic energy project now being initiated on the South Carolina-Georgia border is expected to afford a large number of jobs at relatively high wages. This project and other outlets for labor may offset the comparatively favorable price situation and hold production in 1951-52 to about the relatively low level of the previous season.

Production of wood rosin has shown a marked upward trend since mid-1949. Output in April 1950-February 1951 was 22 percent higher than a year earlier. The total for the crop year through March 1951 was approximately 1,340 thousand drums compared with 1,099 thousand drums a year earlier. Production was increasing during 1950 and by fall, these plants were operating at nearly practical capacity. Part of this increase in production at steam distillation plants has reflected an increase in the number of hours worked per week. Production for the 1951-52 season is expected to be about 1,400 to 1,450 thousand drums. The sharp rise in rosin and turpentine prices has made it profitable for the smaller plants to gather stumps and lightwood from more distant areas, as is a normal practice for the larger firms.

Total output of gum and wood rosin in 1951-52 may be slightly above the 1950-51 total of about 2,140 thousand drums.

Exports of gum and wood rosin in the 11-month period April 1950-February 1951 totaled 871 thousand drums, 66 percent greater than for the same period of the preceding year. Respective increases for successive periods were 10 percent in April-June; 47 percent in July-September; 129 percent in October-December and 124 percent in January-February 1951. The outbreak of hostilities in Korea greatly stimulated foreign demand for U. S. naval stores. Effective January 30, 1951, rosin was added to the positive list requiring validated licenses for exportation and this may tend to restrict exports somewhat.

Strong Demand for Rosin
in Prospect

Domestic demand for rosin in 1951-52 will continue strong. The high rate of industrial activity means large requirements for rosin not only in its customary uses, but also in new uses that are constantly being developed and as a substitute for other chemical raw materials in short supply as a result of expanded demand. Export demand also is likely to remain strong. Re-armament in Western European countries is getting under way. This is increasing the rate of industrial activity abroad. Many foreign countries have increased supplies of dollar exchange as a result of large U. S. purchases abroad of raw materials, such as rubber, tin, chemicals, and other goods in short supply in this country.

With demand strong and only a slight increase in production expected, the price of rosin is expected to remain at ceiling levels.

OUTLOOK FOR TURPENTINE

BACKGROUND.- Turpentine is used largely as a paint and varnish thinner. Domestic demand for turpentine declined materially during the 1920's as a result of competition from petroleum fractions. These products displaced a large volume of turpentine formerly used in the manufacture of prepared paints and varnishes. However, turpentine continued to be used as a paint thinner for home and on-the-job mixing of paints. In more recent years, extensive packaging of turpentine in small containers and the development of important chemical uses have increased the outlets for turpentine. Quite recently a substantial market has opened up in insecticide manufacture and the production of additives for lubricating oil exposed to extremely high temperature.

Fluctuations in the price of turpentine are often severe. When consumer income is low, people defer painting their houses; when it is high, they make repairs and do their painting. As a result, demand for turpentine tends to fluctuate widely. Production of gum turpentine, however, responds slowly to price changes. In good times, workers tend to leave the piney woods for better jobs in industry, so that the same economic conditions that increase the demand for turpentine tend to reduce the production of gum turpentine.

The Savannah price of gum turpentine in the spring of 1950 was at the support level of 40 cents per gallon, but was slightly higher than a year earlier. The support price a year earlier was also 40 cents per gallon but prices for the year averaged 38.4 cents. The loan rate for 1951-52 has been initially set at 50 cents per gallon. The price rose sharply, however, after the outbreak of hostilities in Korea, and in March 1951 the Savannah price averaged 92 cents per gallon. Ceiling prices were imposed late in January 1951

Reflecting the strong demand for turpentine arising from the Korean crisis, CCC stocks were reduced from 52 thousand barrels (50 gallons each) July 1, 1950 to 30 thousand barrels August 15, 1950, at which time sales for export were terminated. Sales after that period were for domestic emergency use only. CCC stocks were reduced to 18 thousand barrels on August 31, and all sales to the trade were terminated on February 13, 1951, at which time CCC stocks were reduced to 10 thousand barrels.

Total Production in 1951-52
May Increase

As in the case of gum rosin, output of gum turpentine for the 1951-52 season is likely to be about the same as a year earlier. Production of steam distilled and sulphate wood turpentine is expected to increase. Thus total output of turpentine probably will be larger than in 1950-51.

Output of gum turpentine in 1950-51 was lower than a year earlier, but production of wood turpentine was higher. Output of gum turpentine in April 1950-February 1951 totaled about 264 thousand barrels, about 15 percent less than during the same period a year earlier. The total for 1950-51 was about 275 thousand barrels compared with 323 thousand in 1949-50. Production of steam and destructively distilled wood turpentine in April 1950-February 1951 was 20 percent larger than a year earlier, and the total for the crop year probably approximated 240 thousand barrels compared with 203 thousand barrels in 1949-50.

Output of sulphate wood turpentine, recovered as a by-product of the sulphate paper manufacturing process, also has been rising since mid-1949. Production in the 1950-51 season was around 193,000 barrels, up 31 percent from a year earlier. A recently developed type of insecticide derived from turpentine has proven so successful that the manufacturer is underwriting the installation of machinery for recovering the turpentine in sulphate paper plants that do not yet have such machinery. Hence a further increase in sulphate wood turpentine production is to be expected, but this increase will be absorbed largely in insecticide manufacture and thus will not be available to meet other trade requirements.

Export Demand to Continue
Strong

Exports of gum and wood turpentine in April 1950-February 1951 totaled 191 thousand barrels, 34 percent larger than in the same months of the preceding year. The increase over a year earlier was 13 percent in April-June, 62 percent in July-September, 37 percent in October-December and 16 percent in January-February. Effective January 30, 1951, export licenses were required for turpentine.

Turpentine Prices to Hold
at Ceiling Levels

With little change in production from the preceding year and a continued strong domestic and export demand, prices of turpentine are expected to continue at the ceiling level.

RECENT GOVERNMENT ACTION

To encourage domestic production and conserve supplies to meet essential needs, the Government has taken the following steps:

Support Level for 1951 Crop Gum Naval
Stores Set at 90 Percent of Parity

On January 29, 1951, the Department of Agriculture announced that the support level for crude pine gum produced in 1951 would be set at 90 percent of the parity price.^{1/} Based on the April 1 parity price for crude pine gum, the support level for the naval stores unit of 50 gallons of turpentine and 1,400 pounds of rosin has been established at \$128.21. This was 73 percent of the market price on that date. Loan rates for turpentine, bulk, initially are set at 50 cents per gallon and for gum rosin grading G or above at \$7.37 per hundred pounds, net, in drums. Loan rates for turpentine and rosin may be adjusted from time to time, though always maintaining the per unit support level of \$128.21. The support price under the 1950 program was set at \$86.82 per unit, equivalent to 60 percent of the parity price on April 1, 1950. The higher support rate for the 1951 crop will provide a higher floor in the event of any sudden drop in demand.

As in other years, loans will be available through December 31, 1951, on naval stores produced in calendar year 1951 by producers who cooperate in the Gum Naval Stores Conservation Program or who otherwise follow good conservation practices as determined by the Department of Agriculture.

CCC Terminates Sales of
Gum Turpentine and Restricts
Sales of Gum Rosin

Effective February 13, 1951, sales of gum turpentine by the Commodity Credit Corporation to the trade were terminated, as stocks had been reduced to only 10,000 barrels. It is contemplated that the remaining stocks will be frozen, pending allocation to direct and indirect military use. Since the start of postwar sales in June 1948, 159 thousand barrels of gum turpentine have been sold by CCC to the trade for domestic and export shipment. Since August 15, 1950, all sales by this agency have been for emergency domestic use for packing in containers not exceeding 5-gallon sizes.

Effective February 1, gum rosin was removed from the monthly availability listing of CCC. However, limited quantities are still available for domestic sale and use only. Purchasers must certify that the rosin will be used for their own consumption or against firm orders.

^{1/} Beginning in December 1950, the computation of the parity price for crude pine gum has been substituted for the computation of parity prices of gum rosin and gum turpentine.

Export Licensing Required for
Rosin and Turpentine

Effective January 30, 1951, rosin and turpentine were added to the positive list requiring validated licenses for exportation. The Office of International Trade stated that by placing all naval stores under export control and carefully screening all license applications for each type of commodity in relation to its supply, it could maintain an equitable, flexible control over naval stores and prevent an excessive drain on any one commodity.

Prices of Rosin and Turpentine Frozen
at Highest Level Reached During
December-January Base Period

Under the General Ceiling Price Regulation, issued January 26, 1951, prices of turpentine and rosin are controlled on the basis of the highest price received by each seller in the base period (December 19, 1950-January 25, 1951). Prices of crude pine gum at the producer level are exempt from control. Amendment No. 2 to this Regulation, effective February 28, 1951, clarifies what constitutes the highest price received in the base period for manufacturers and wholesalers.

Market News Service Inaugurated
In Early January

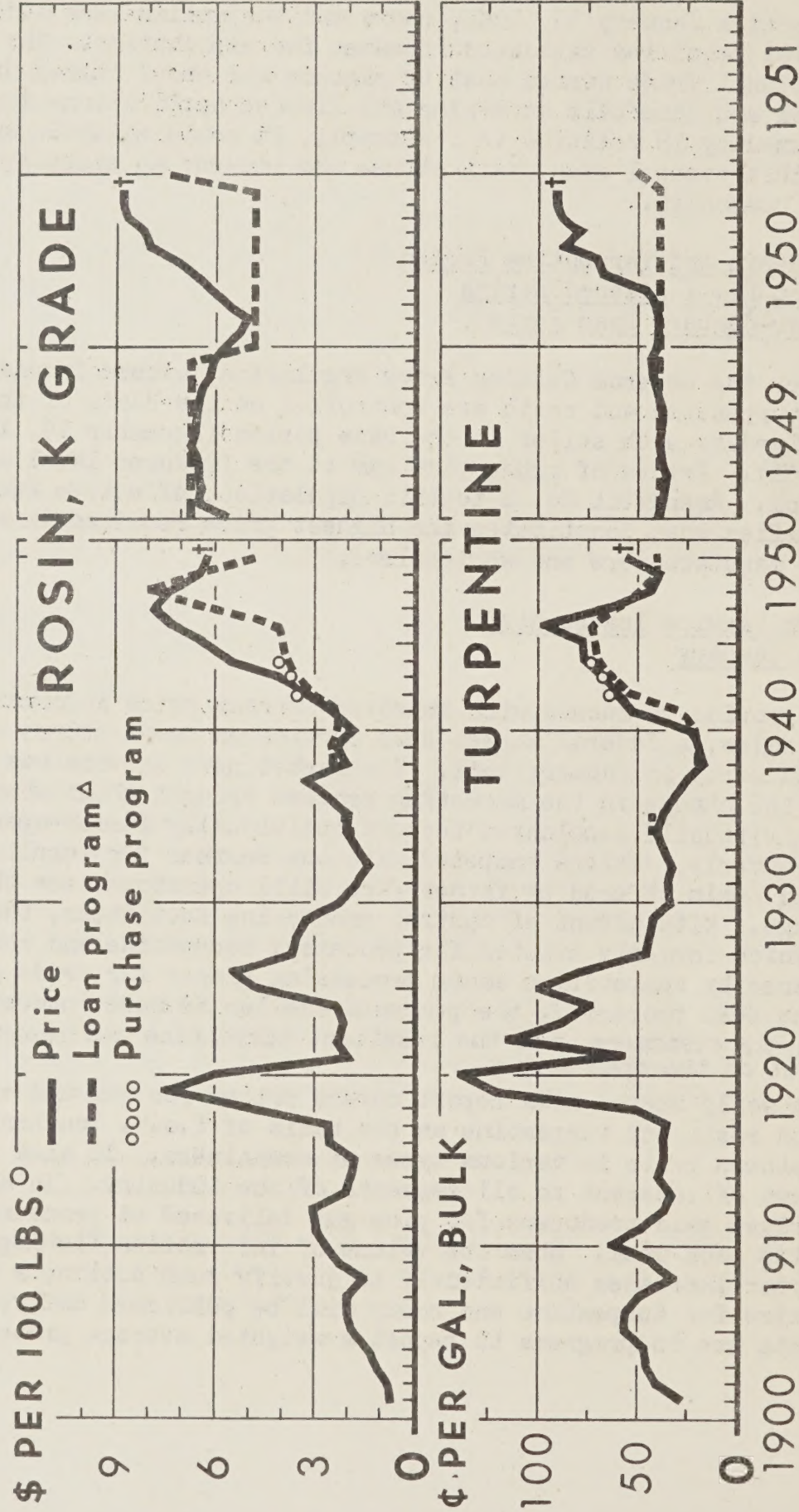
To provide producers with improved current price information based on actual sales, a Federal market news service on naval stores was started in Savannah early in January 1951. The market news service was made necessary by the change in the marketing process brought about when central processing virtually supplanted the old individually farmer-operated "pot still." Formerly, dealers competed with one another for supplies of turpentine and rosin offered by farmer fire still operators over the Savannah Exchange. With advent of central processing facilities, the competition which formerly existed for processed turpentine and rosin has been replaced by competition among processing plants for crude gum. Once the gum has been processed, the processor-seller is more interested in supplying his customers with the resultant turpentine and rosin than in offering it on the open market.

The daily market news report covers prices for gum and steam-distilled wood rosin and turpentine on the basis of f.o.b. Southern plants and f.a.s. Southern ports in various types of containers. It also carries current news of interest to all segments of the industry. In addition, average prices paid producers for pine gum delivered at processing plants are reported each week. When the volume of information flowing to the news reporter increases sufficiently to justify such action, a weighted average price for turpentine and rosin will be published daily; meanwhile, arrangements are in progress to report a weighted average price each week.

SAVANNAH PRICES OF GUM NAVAL STORES

BY YEARS*

BY MONTHS*



*YEAR BEGINNING APRIL

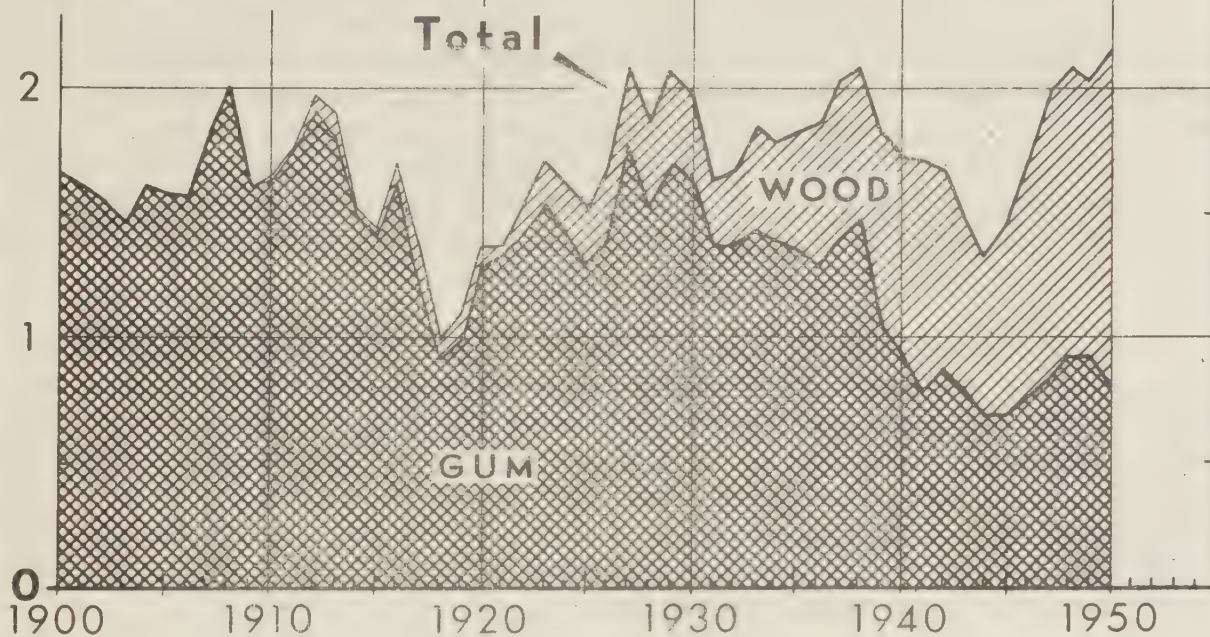
^oNET, IN DRUMS

[†]PRELIMINARY

△ THERE WAS NO SUPPORT PROGRAM IN 1936 AND 1937. THE LOAN RATES FOR ROSIN IN 1941 AND FOR ROSIN AND TURPENTINE IN 1948 ARE WEIGHTED AVERAGES AS THE SUPPORT PRICES WERE CHANGED DURING THE YEAR

ROSIN PRODUCTION*

MIL. DRUMS^o



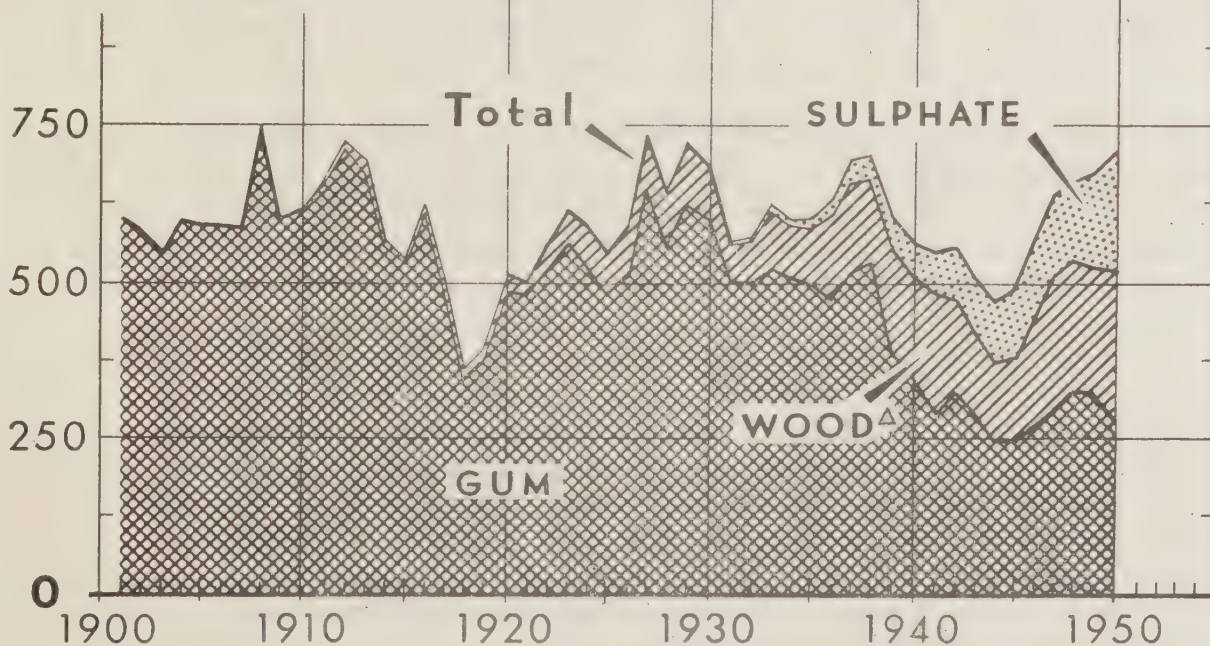
* YEAR BEGINNING APRIL ^o DRUMS OF 520 LBS. NET WEIGHT
DATA FOR 1950 ARE PRELIMINARY

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TURPENTINE PRODUCTION*

THOUS. BARRELS^o



* YEAR BEGINNING APRIL ^o BARRELS OF 50 GALLONS EACH
^Δ EXCLUDING SULPHATE DATA FOR 1950 ARE PRELIMINARY

U. S. DEPARTMENT OF AGRICULTURE

NEG. 48086-XX BUREAU OF AGRICULTURAL ECONOMICS

HISTORICAL BACKGROUND

The Gum Naval Stores Industry

The term "naval stores" goes back to colonial days, when pine gum was converted into tar and pitch for caulking wooden ship hulls and preserving rigging. The term now embraces all products of pine gum, and related products derived from pine wood. Rosin and turpentine have been the major naval stores products since the decline of wooden ships. Turpentine was originally the principal product. Rosin was once considered a byproduct and thrown away at the still. In recent years, however, more than three-quarters of the total value of a naval stores unit has been contributed by rosin.

The Southeast Coastal Area of the United States has long been a major center of world production of naval stores. North Carolina and South Carolina held the lead from colonial days up to the last quarter of the nineteenth century. With the depletion of the virgin stands of long-leaf pine in the Carolinas, the center of the industry moved to Florida and Georgia, with the Gulf Coast States contributing important quantities. However, due to heavy timber cutting, the virgin forests of long-leaf pine soon disappeared from these areas too.

A major decline in the gum naval stores industry was prevented by the adoption early in the 1900's of methods suited to collection of gum from second-growth trees. The number and width of the cuts on the trunk (known as "streaks") was reduced. Cups were hung on the trees to catch the gum. These methods, which have now been widely adopted, not only are applicable to trees of relatively small diameter, but are less harmful to the growth of the tree than the former system of boxing, which consisted of cutting a cavity into the base of the tree to hold the crude gum flowing down from the streaks. The present gum naval stores industry is based on stands of second-growth long-leaf and slash pine in South Carolina, Georgia, Florida, Alabama, and Mississippi. Northern Florida produces about 20 percent and Southern Georgia about 75 percent of the total output of pine gum.

In the first 40 years of the present century, the pine gum was converted into rosin and turpentine at fire stills. Still operators would typically lease, for a number of years, turpentine rights on enough pine land to assure a sufficient supply of gum for economical operation of the still each season.

In the past 15 years, fire stills have been largely displaced by central distilling plants using steam. Most of these plants have adopted the USDA "Olustee" process of gum cleaning. This process makes it practicable to accept small lots of gum of relatively poor quality. Formerly, it was difficult for small producers to sell their gum to the fire stills. The gum often was not acceptable for use in the fire stills because it contained excessive foreign matter such as chips and trash. The central stills now provide a ready cash market throughout the year for lots of any quantity and of varying quality. As a result, collections of gum by comparatively small, independent producers has increased. Fire-stills have become a negligible part of the industry.

A recent development that may have a major influence on gum production is the application of acid to the "streaks" (the slashes on the tree from which the gum flows). Streaks sprayed with sulphuric acid continue to produce gum longer than untreated streaks. Hence a chipper can work a greater number of trees, and can approximately double his output of gum for the season. The number of acid-treated trees in commercial naval stores operations in 1950 was 7.5 million, roughly 10 percent of the number of trees worked, compared with about 0.3 million in 1946.

The Wood Naval Stores Industry

A new source of rosin and turpentine was developed early in the 1900's through the steam distillation of pine stump wood. Steam distillation products are termed "wood naval stores," as distinguished from "gum naval stores."

A wealth of pine stumps and dead branches ("lightwood") was left on vast acreages after lumbering operations in the Southern States. This land often had little economic value except for the rosin and turpentine content of the stumps and lightwood and for the growing of new trees. The wood naval stores industry was developed to take advantage of these resources. The stumps and other dead pine wood are transported to central plants, where the wood is cut and shredded and subjected to solvent extraction, followed by steam distillation of the extract.

A long period of research was needed to obtain economical processing methods and acceptable products. Output remained relatively small for many years, but by 1925 production of wood rosin was nearly one-fifth as large as output of gum rosin; by 1935, over one-third as large; by 1940, over four-fifths as large; and by 1945, about 10 percent larger. The supply of stumps is believed to be large enough to support a high level of production of wood naval stores for many years.

The ratio of rosin to turpentine production from steam distillation of wood is about 5.5 drums to 50 gallons of turpentine compared with about 2.7 drums to 50 gallons of turpentine from distillation of gum. Other important products are pine oil and dipentene. Pine oil has a pleasant odor and for this reason is used in deodorants and disinfectants. When combined with acids and coal-tar derivatives, it is used to produce a flotation oil used by the mining industry. It also is used to a lesser extent in wool-scouring detergents, in certain protective coatings, and as a plasticizer. Dipentene is used as an anti-skimming agent in quick-drying enamels. The spent wood remaining after distillation is used for fuel or converted into insulation. The large capital investment required and the difficult processing and chemical problems that had to be solved to make the steam distillation process a successful commercial enterprise led to emphasis on research, careful management, development of new products, uses and markets, and attention to specific needs of users. These practices, together with the fact that the wood industry is highly mechanized and thus has a lower labor cost per unit of output, enabled the wood naval stores industry to become increasingly competitive with gum products.

Other Sources of Naval Stores

Production of paper pulp by the sulphate ("Kraft") process results in two byproducts that are classified as naval stores--sulphate wood turpentine and tall oil. Practically no sulphate wood turpentine was recovered before 1935. Without refining, crude sulphate wood turpentine has an objectionable odor which limits its use in the crude form. After careful refining, however, sulphate wood turpentine is usable for many of the same purposes as other turpentines. Some of the paper mills do their own refining. In addition, several central plants were built in the late 1930's for refining the crude turpentine obtained from other paper mills. Output of sulphate wood turpentine has increased steadily since 1935 (table 7). In recent years production of sulphate wood turpentine has been nearly as large as that of steam distilled wood turpentine. If present trends continue, production of sulphate wood turpentine may exceed production of steam distilled wood turpentine.

Tall oil is a mixture of resin acids and fatty acids. It is recovered by a chemical process from the spent alkaline liquor of the sulphate paper process after the wood has been cooked to a pulp. The resin acids in tall oil are practically identical with the acidic components of rosin. The fatty acids, present as such in the growing pine tree, are closely related to the components of both vegetable and animal fats. Production of tall oil in the United States on a commercial scale began in the late 1930's and turned sharply upward during World War II. In the war period tall oil was in great demand as a substitute for scarce fats and rosin in soap making and for the production of synthetic drying oils for use in paints, varnishes, and linoleum. Since the war, the latter group of uses has furnished the major reported use of tall oil. Exports have been an important outlet. Use in soap has declined. Recently a method of completely separating the resin and fatty acids has been adopted on a commercial scale whereby the resin acids are recovered in the form of rosin, designated "tall oil rosin."

Destructive distillation of pine wood, by heating to the point of carbonization, is a relatively small industry. The major products are charcoal, pine tar, tar oils and pitch. Relatively small quantities of turpentine and pine oil also are obtained in the process. No rosin is obtained since the resin content of the wood undergoes partial decomposition to form the tars and pitch.

Trends in Production, Uses, and Exports

Rosin

Total production of gum and wood rosin since 1900 has not shown any clear trend, either upward or downward. Peaks of about 2 million drums annually have been reached twice in each decade since 1900. There were major declines in output in World War I and World War II when labor was drawn out of the pine woods by military service and by opportunities for higher wages in wartime industry. The low point in total production of gum and wood rosin in World War II was 1.3 million drums, in 1944. This was materially above the low point of 1.0 million drums in World War I. Output of wood rosin, of relatively slight importance in the 1920's, had increased to over 40 percent of total rosin output by 1939 and was well maintained during the war.

Domestic consumption of rosin has shown an upward trend over the last 50 years, rising from an average of 0.6 million drums in 1905-9 to nearly 0.9 million in 1925-29, slightly over 1.0 million in 1935-39, and 1.3 million in 1945-49. The increase from 1925-29 to 1945-49 was more rapid than population growth. Use per person increased from 3.7 pounds to 4.6 pounds. The increase in use of rosin from 1925-29 to 1945-49, however, was somewhat smaller than the increase in the Federal Reserve Board index of industrial production for all commodities.

The major uses of rosin are for "sizing" or impregnating various types of paper and paper board; in protective coatings such as varnishes, enamels, and paints; in chemicals and pharmaceuticals, and in yellow laundry soap. Minor uses include adhesives and plastics, linoleum and floor coverings, oils and greases, paint dryers, rubber compounding materials, miscellaneous railroad and shipyard uses, printing inks, and shoe materials.

Rosin has been an important sizing agent for a long time. Paper and paper size have accounted for 25 to 35 percent of the domestic disappearance in practically every year from 1922 (when records of use were begun) to date. Rosin size, in the form of an aqueous solution, is added in the pulp-beating stage of the paper-making process, whereas most other types of size are applied by a separate process to the finished paper, thereby increasing the cost of the finished product. Since 1940 consumption of rosin as a paper size has been well above most earlier years, reflecting the growth of the paper industry. Since 1947, more rosin has been consumed in paper and paper size than in any other use.

Varnishes, paints, ester gum, and synthetic resins have accounted for 15 to 30 percent of total rosin use in the United States in practically every year since 1921. In 1946, 383 thousand drums of rosin, the highest of record, were consumed in this group of products. These uses declined in 1946-49, however, reflecting increased competition from synthetic resins not containing rosin.

Chemicals have become an important outlet for rosin in a comparatively short time, rising from 9 percent of domestic consumption in 1936 to a peak of 28 percent in 1948 and 1949. Current research promises to develop many new and expanded outlets in the field of modified rosins, rosin-acid derivatives and resinates.

Soap manufacture provided the major domestic market for rosin in 1923 but has shown a marked decline since. In 1945-49 use of rosin in soap averaged 10 percent of total rosin consumed compared with 21 percent in 1925-29. The outlet for rosin in soap has been largely for yellow bar laundry soaps, which have declined in popularity with the increasing use of washing machines. According to the Census of Manufactures for 1947, rosin consumed in soap in that year totaled 144 thousand drums, a decline of 23 percent from 1939, when the preceding Census of Manufactures was taken, and a decline of 36 percent from 1925. Total production of soap in 1947 was nearly 4.1 billion pounds, over 5 percent more than in 1939 and 32 percent more than in 1925. Production of granulated and powdered soaps totaled over 1.5 billion pounds in 1947 compared with 0.4 billion pounds for yellow bar soap, whereas in 1925, production of granulated and powdered soap totaled only 0.1 billion pounds compared with 0.7 billion pounds for yellow bar soap. Thus, the percentage drop in the production of yellow bar soap between these two dates was somewhat larger than the percentage drop in the use of rosin in soap.

In recent years, production and sales of soap declined somewhat, reflecting the competition of synthetic detergents. In 1950, sales of synthetic detergents accounted for about 30 percent of the total for soap and synthetic detergents. Rosin is not used in the manufacture of synthetic detergents.

Exports of rosin in the last 50 years have shown a downward trend, falling from an average of 1.1 million drums in 1905-09 to 1.0 million in 1925-29, 0.8 million in 1935-39, and 0.5 million in 1945-49. This reflected in part a downtrend in total world exports and in part a decline in the United States share of the total. During the 1920's and the 1930's soap was a major outlet for rosin in many countries. Use in this product declined for the same reasons as in the United States and also because of the substitution of vegetable oils for rosin, particularly in surplus oil-producing countries such as Brazil. The more than proportionate shrinkage of United States exports was caused by a number of factors. The trend toward a balancing of trade between individual countries was important in causing importing countries, particularly Germany, to shift to sources of supply outside of the United States wherever possible. The price-support program in this country stimulated production in other areas, particularly since increased exports of naval stores provided foreign countries with a ready means of improving their balance of payments. During and following World War II, this situation was aggravated by the general shortage of dollar exchange. Over the past quarter-century, the leading importers of United States rosin have been the United Kingdom, Germany, Japan and Brazil.

Table 1.- Rosin: U. S. exports and exports as a percentage of U. S. production, average 1905-09, 1926-29, 1935-39, annual 1946-50

Crop year beginning April 1	Exports			Total exports as a percent- age of production	
	Gum	Wood	Total	Production	
	: drums 1/	: drums 1/	: drums 1/	: drums 1/	: Percent
1905-09	N. A.	N. A.	2/1,092	1,712	64
1926-29 3/	862	168	1,029	1,927	53
1935-39	567	255	822	1,922	43
1946	320	181	501	1,720	29
1947	296	296	592	1,991	30
1948	236	266	502	2,076	24
1949	257	305	562	2,024	28
1950					
Apr.-Feb.	555	316	871	1,993	44

Compiled from Agricultural Statistics 1939, 1947 and 1949 and naval stores reports of the Bureau of Agricultural Economics.

N. A. not available.

1/ Drums of 520 pounds net weight. 2/ Calendar year 1905, crop years 1906-09. 3/ 1925-29 average not used because no breakdown between gum and wood was available for 1925. Total exports for the period 1925-29 averaged 997 thousand drums, 54 percent of production.

Turpentine

Fluctuations in total production of turpentine have been similar to those in the output of rosin, except that there has been a slight downward trend since 1908 in the production of turpentine. Successive peaks were 750 thousand barrels in 1908, 737 thousand in 1927, 709 thousand in 1938, and 673 thousand in 1949. The increasing output of wood naval stores with a higher rosin-turpentine ratio, has contributed enough rosin to offset the decline in gum rosin output, but not enough turpentine to offset the decline in gum turpentine. However, this trend may soon be reversed owing to the increasing output of sulphate wood turpentine.

Turpentine consumption in the United States has shown an upward trend in the last 50 years, rising from an average of 304 thousand barrels in 1905-09 to 362 thousand in 1925-29, 416 thousand in 1935-39, and 508 thousand in 1945-49. Use of turpentine increased more rapidly from 1925-29 to 1945-49 than did population but fell considerably behind the 90 percent rise in industrial production.

Turpentine is used principally for thinning oil-base paints and varnish at the time of application. Paint and varnish manufacturers have largely shifted from turpentine to mineral spirits, which is lower in price. In addition, part of the thinner use at time of application also has shifted to mineral spirits, although most home owners and individual painters prefer turpentine. Increasing sales of water-base paints have reduced the demand for turpentine further. These trends have been partially offset by improvements in merchandizing and packaging (mainly in small, convenient, attractive containers). It is estimated that paint-thinning uses of turpentine in 1949 accounted for about 85 percent of the total domestic disappearance of turpentine.

Other important industrial uses of turpentine are in some pharmaceuticals, as cough medicines and counter-irritants, and for producing chemical raw materials such as pinene. Pinene is used in making synthetic camphor (a raw material in many medicines, celluloid, and smokeless gunpowder), synthetic resins and isoprene. Isoprene is used in making a type of synthetic rubber. Use in chemicals comprised 14 percent of domestic consumption in 1949 compared with 6 percent in 1936, 11 percent in 1941, and over 25 percent in 1943 and 1944. Chemical and pharmaceutical uses of turpentine declined considerably after the war, apparently as a result of competition from other competitive synthetic chemicals, but are still well above the prewar average. Consumption in this field probably will increase, as turpentine-derived chemicals are being used in a special lubricant for jet planes and similar aircraft. Several insecticides have quite recently been developed which provide a new outlet for turpentine or some of its component chemical compounds. These are particularly useful in boll weevil control.

Exports of turpentine from the United States in the last half century have shown a downward trend, declining from 319 thousand barrels in 1905-09 to 288 thousand in 1925-29, 244 thousand in 1935-39, and 113 thousand in 1945-49. As with rosin, this reflects both a decline in total world exports and in the United States share of the total. The reasons for the decline in the proportion exported by the United States are similar to those given earlier for rosin. For at least two decades before the war, over 80 percent of the United States exports went to the United Kingdom, Germany, the Netherlands, Canada, Australia, and Belgium. The United Kingdom alone took nearly half the exports in this period. Exports declined sharply in the war period, dropping to 43 thousand barrels in 1942, the lowest of record.

Table 2.- Turpentine: U. S. exports and exports as a percentage of U. S. production, average 1905-09, 1925-29, 1935-39, annual 1946-50

Crop year:	Exports			Exports as a	
beginning:	Gum	Wood	Total	Production:	percentage
April 1 :	:	:	:	:	of production
:	1,000	1,000	1,000	1,000	
:	barrels 1/	barrels 1/	barrels 1/	barrels 1/	Percent
1905-09 :	N.A.	N.A.	2/319	623	51
1925-29 :	272	16	288	649	44
1935-39 :	208	36	244	650	37
1946 :	64	41	105	570	18
1947 :	56	37	94	641	15
1948 :	71	46	117	659	18
1949 :	99	56	156	673	23
1950 :					
Apr.-Feb.:	130	61	191	660	29

Compiled from Agricultural Statistics 1939 and 1947 and naval stores reports of the Bureau of Agricultural Economics.

N. A. not available.

1/ Barrels of 50 gallons each. 2/ Calendar year 1905, crop years 1906-09.

Government Programs for Gum Naval Stores

Price-Support Programs

Gum rosin and gum turpentine, or the content thereof in gum, are expressly designated as agricultural commodities by the Agricultural Marketing Act, the Agricultural Adjustment Act of 1938, as amended, and other agricultural legislation. This makes gum rosin and gum turpentine eligible for price support programs of the Commodity Credit Corporation. Prices of wood naval stores are not eligible for support but, as indicated below, are affected by programs for gum naval stores.

Government price-support programs have had an important effect on market prices of rosin and turpentine in most years since 1933. In years of relatively weak demand or large production, CCC accumulated stocks of gum rosin or turpentine, or both. The withdrawal of these quantities

from commercial channels made market prices higher than they otherwise would have been. Since wood rosin and turpentine in most cases are readily substitutable for gum rosin and turpentine, the programs had a price-supporting effect on wood naval stores as well as gum naval stores. In years of relatively strong demand or small production, market prices usually rose above support levels, and users drew upon CCC stocks of gum naval stores. In these years, the program prevented prices of rosin and turpentine from rising as far as they otherwise would have risen.

Prices of gum rosin and gum turpentine were supported in the 1934 and 1935 crop years through non-recourse loans to producers. The programs in those years also included restrictions on marketings. In settlement of the loans, CCC accepted delivery of rosin and turpentine in lieu of cash. Stocks of gum rosin and turpentine accumulated by CCC in this way were liquidated during 1936 and 1937, when there were no price support programs. Market prices of rosin were up sharply in those years. Demand for turpentine did not strengthen as sharply as for rosin, and prices declined.

CCC has offered non-recourse loans to producers on gum rosin and gum turpentine each year from 1938 to date. In 1942, 1943 and 1944, CCC had a purchase program also, in which gum rosin and gum turpentine were purchased as offered by producers, at prices set slightly above loan rates. Data on these programs are shown in table 10.

Loan rates for gum rosin and gum turpentine in 1934, 1935, and 1938-40 were at levels which resulted in 56 to 65 percent of parity for the gum naval stores unit (1,400 pounds of rosin and 50 gallons of turpentine). In 1942, loan rates were raised so as to average 85 percent of the parity price of the naval stores unit. This level was chosen to conform with the "Steagall Amendment," Public Law 147 (77th Congress), July 1, 1941. This specified minimum support prices of 85 percent of parity for those farm products for which farmers were formally requested to expand production by the Secretary of Agriculture. The amendment also made it a policy of the Department to support prices of all other agricultural commodities (including gum naval stores, which were not "Steagall" commodities) at a fair parity relationship to the extent funds were available. With subsequent change in the law to require support for "Steagall" commodities at 90 percent of parity, loan rates for gum rosin and gum turpentine were advanced in 1943 to average 90 percent of the parity price of a naval stores unit. This level was held through the 1948 crop year. The "Steagall" requirement expired December 31, 1948, and loan rates for gum rosin and turpentine were reduced in the 1949 crop year to average 80 percent of parity for the naval stores unit. At the beginning of the 1950 crop year the loan rates were lowered further, to the 60-percent level.

Market prices of rosin advanced more rapidly in 1941-46 than the CCC loan rates. The reduced output and exceptionally strong demand resulting from wartime conditions led users of rosin to draw heavily upon CCC stocks accumulated in 1938-40. These stocks, which reached a peak of 1,159 thousand drums at the end of the 1940 marketing year, were practically exhausted by December 1944.

Relatively large stocks of turpentine acquired by CCC during the 1938 program were gradually drawn upon in the following 3 years and exhausted by December 1941. Stocks again were accumulated by CCC under the 1942 and 1943 programs. These stocks reached a peak of 224 thousand barrels at the end of the 1943 marketing year but 2 years later were exhausted.

Maintenance in 1947 and 1948 of loan rates at levels averaging 90 percent of parity for the naval stores unit led to substantial accumulations of CCC stocks of turpentine in 1947 and 1948 and of rosin in 1948. The support levels in these years were much higher than previously, in terms of dollars and cents, because the parity index rose sharply with the postwar advance in the general price level. At the same time, demand for rosin receded from the wartime high as supplies of competitive materials became more plentiful for uses in which rosin had been substituted during the war. Loan rates on rosin and turpentine were lowered in the 1949 crop year to average 80 percent of parity for the naval stores unit, but there was a further accumulation of rosin stocks.

Except in 1942-46, relative loan rates for rosin and turpentine each year were established in accordance with the respective economic situations for these commodities. For example, loan rates for turpentine in 1938 and 1939 were materially reduced from the 1935 level, but loan rates for rosin were increased. These adjustments were made because market prices in 1936 and 1937, when there were no programs, indicated that relatively low prices for turpentine were necessary to prevent consumption and exports from falling substantially below output. Similar adjustments were made in the postwar years. The loan value of a naval stores unit was maintained in 1947 and 1948 at 90 percent of parity, but the loan rate for turpentine was established well below parity and that for rosin above parity, to avoid unduly depressing consumption and exports of turpentine. Loan rates for turpentine in every year since 1937 (except 1942-46) have been at a lower percentage of the parity price than the loan rates for rosin.

Conservation Programs

Federal conservation programs affecting gum naval stores began July 15, 1936. Payments to gum producers were made in the remainder of the 1936-37 season for not working a specified part of their timber. In the 1937 and 1938 crop years, payments were made for conservation practices such as the discontinuance of chipping on small trees and for conservative working of larger trees. In 1939-41, gum producers were required to limit output to be eligible for conservation payments. Low prices for naval stores encouraged participation in this program, and production of gum rosin and gum turpentine declined. Because of the large wartime needs for naval stores, the limitations on output were omitted from the conservation programs in 1942 and subsequent years. New conservation practices have been added to the conservation program in recent years, notably "selective cupping." This is a practice in which only part of the trees large enough for working are cupped, the others being left to be cupped after the first group are worked out and cut for other wood products.

Only those producers who participate in the conservation program or who otherwise follow good conservation practices as determined by the Department of Agriculture are eligible for Government price-support loans.

Price Controls During World War II

Naval stores were brought under control by the General Maximum Price Regulation on May 11, 1942 at the March 1942 level. After a few days, however, gum naval stores were exempted as agricultural commodities, although controls were continued on wood naval stores. The prices of gum turpentine and rosin were appreciably below parity at the time and required Commodity Credit Corporation price support during 1942 and 1943 to maintain the 85 to 95 percent of parity support level. Until 1944, upward pressure on rosin prices had been reduced by CCC rosin liquidations. However, when these stocks had been virtually exhausted early in 1944, prices rose rapidly until checked by a 60-day price freeze ordered June 28, 1944 under TMR-36. The Savannah price of K grade rosin was fixed at \$6.05 per hundred pounds. A rollback to \$5.61 for K grade rosin was incorporated into the permanent order of September 20, 1944 (MPR 561). This rollback was partially offset on October 11 (Amendment 1 to MPR 561), when the ceiling for K grade rosin was increased to \$5.87. The ceiling price was increased again August 7, 1945 to \$6.80, reflecting substantially increased production costs, which had risen rapidly to a point where maintenance of even the low wartime production was threatened.

Because of substantial CCC holdings, gum turpentine was not placed under formal control until January 15, 1946, when a ceiling of 83.5 cents per gallon was imposed. As in the case of rosin, prices had been held in check by liquidations of substantial CCC stocks which were largely depleted by the end of 1945.

During the temporary lapse in price controls, July 1-25, 1946, the price of turpentine rose more than 20 cents to \$1.04 per gallon, while K grade rosin increased 37 cents to \$7.17 per hundred pounds. Following reimposition on July 25 of turpentine and rosin controls, prices of both commodities returned to ceiling levels. However, producers exhibited a tendency to withhold their rosin and turpentine in anticipation of increased prices. Rosin was decontrolled by OPA effective August 28, 1946, on the basis of adequate supplies and absence of inflationary pressure. In the case of turpentine, ceilings were increased to \$1.05 per gallon on September 6, 1946. The old ceiling had been below parity from April 29 and was 11.7 cents less than parity at the time the ceiling was increased. Gum turpentine was decontrolled on November 9, 1946, following the President's message announcing decontrol of all except a few specific items.

During this period, steam-distilled wood rosin and sulphate wood turpentine had been under control at much lower prices comparatively than gum turpentine and rosin. Ceiling prices for wood rosin, for example, were nearly \$2.00 less than those prescribed for gum rosin. As a result of these substantial ceiling price differentials between wood and gum naval stores products, the relative popularity of wood rosin and turpentine greatly increased.

Table 4.- Production of rosin and tall oil, annual 1897-1950

Year beginning April 1	Rosin			Tall Oil (resin content) 2/ 1,000 drums 3/ 4/
	Total 1/	Gum	Wood	
	1,000 drums 3/ 4/	1,000 drums 3/ 4/	1,000 drums 3/ 4/	
1897	1,332	1,332	---	---
1898	1,398	1,398	---	---
1899	1,426	1,426	---	---
1900	1,652	1,652	---	---
1901	1,600	1,600	---	---
1902	1,548	1,548	---	---
1903	1,452	1,452	---	---
1904	1,600	1,600	---	---
1905	1,571	1,571	---	---
1906	1,566	1,566	---	---
1907	1,824	1,824	---	---
1908	2,000	2,000	---	---
1909	1,600	1,600	---	---
1910	1,649	1,638	11	---
1911	1,777	1,758	19	---
1912	1,984	1,905	79	---
1913	1,902	1,798	103	---
1914	1,519	1,492	27	---
1915	1,443	1,412	31	---
1916	1,697	1,626	71	---
1917	1,378	1,249	128	---
1918	997	909	88	---
1919	1,088	996	92	---
1920	1,358	1,287	71	---
1921	1,365	1,323	42	---
1922	1,542	1,409	133	---
1923	1,695	1,533	161	---
1924	1,610	1,404	206	---
1925	1,516	1,288	228	---
1926	1,680	1,387	292	---
1927	2,093	1,765	328	---
1928	1,867	1,522	345	---
1929	2,070	1,696	373	---
1930	1,972	1,621	351	---
1931	1,613	1,357	256	---
1932	1,659	1,363	296	---
1933	1,838	1,430	407	---
1934	1,783	1,387	396	---
1935	1,821	1,361	460	---
1936	1,866	1,286	579	---
1937	2,031	1,388	643	20
1938	2,077	1,466	610	14
1939	1,814	1,054	759	23
1940	1,717	939	779	32
1941	1,708	792	917	46
1942	1,656	869	787	68
1943	1,463	784	679	122
1944	1,318	692	626	139
1945	1,452	694	758	163
1946	1,720	752	968	194
1947	1,991	828	1,163	204
1948	2,076	921	1,155	215
1949	2,024	925	1,099	191
1950				
Apr.-Feb.	1,993	771	1,222	280

Compiled from Gamble's International Naval Stores Yearbook, 1932 and 1938; Agricultural Statistics, USDA, 1940 and 1946; and reports of the Bureau of Agricultural Economics, USDA.

1/ Totals computed from unrounded numbers. 2/ Converted from reported production of crude tall oil to equivalent drums of rosin on the basis of 45 percent resin acids. 3/ Reported in barrels prior to 1944. Converted to drums on basis of 1 barrel = 0.8 drums. 4/ Drums of 520 pounds net weight.

Table 5.- Rosin: Domestic consumption, by types and major uses, 1922-50

Year beginning April 1	Apparent consumption				Un- accounted for 1/2/ :	Reported consumption							
	Total 1/ :	Gum as a percent- age of total	Gum	Wood		Total re- ported 3/ :	Paper and paper size 1,000 drums 5/	Paint, varnish and lacquer 1,000 drums 5/	Ester gums and synthetic resins 1,000 drums 5/	Chemicals and pharma- ceuticals 1,000 drums 5/	Soap 1/ 4/ :	All other 1/ 4/ :	
1,000 drums 5/	Percent	1,000 drums 5/	1,000 drums 5/	1,000 drums 5/	1,000 drums 5/	1,000 drums 5/	1,000 drums 5/	1,000 drums 5/	1,000 drums 5/	1,000 drums 5/	1,000 drums 5/		
1922	836				232	604	130	143	1	226	103		
1923	868				146	722	199	174	2	229	117		
1924	723				31	692	220	175	1	168	127		
1925	825				21	803	251	182	2	225	143		
1926	752				-35	787	260	176	4	189	158		
1927	907				181	726	238	183	7	160	137		
1928	852				94	758	267	196	3	146	146		
1929	975				91	884	311	227	4	183	159		
1930	810				83	727	273	154	4	175	120		
1931	565				-70	634	240	124	3	192	75		
1932	937				365	572	209	97	2	209	54		
1933	814				141	673	257	135	3	211	67		
1934	899				191	708	270	141	2	227	68		
1935	1,030				208	822	286	118	3	223	114		
1936	1,066				91	975	329	112	7/95	238	120		
1937	935				52	883	272	110	89	218	98		
1938	922	60.6	559	363	99	822	255	104	87	188	90		
1939	1,077	53.6	577	500	133	944	284	126	102	188	113		
1940	1,052	49.9	525	526	189	863	262	126	102	153	127		
1941	1,485	53.1	788	697	174	1,311	355	174	216	201	163		
1942	1,191	50.8	605	586	62	1,129	294	131	148	191	158		
1943	1,502	59.2	889	613	189	1,313	382	126	147	182	148		
1944	1,526	61.1	932	594	-15	1,541	379	133	249	265	190		
1945	1,267	49.5	627	640	48	1,219	274	101	251	324	138		
1946	1,372	39.5	542	830	15	1,357	342	113	269	183	135		
1947	1,344	37.0	498	846	12	1,333	347	113	258	153	121		
1948	1,235	30.0	371	864	-8	1,242	355	110	213	94	124		
1949	1,190	29.2	347	843	22	1,167	366	93	200	74	105		
1950													
Apr.-Dec.	1,147	35.8	411	736	39	1,108	8/340	78	232	300	64	94	

Sources: Prior to 1932, reported consumption from USDA Yearbooks and press releases of the Bureau of Agricultural Chemistry and Engineering. Beginning in 1932, from annual naval stores reports of the USDA. For apparent consumption, see table 3. 1/ Computed from unrounded numbers. 2/ Due partly to unreported industrial consumption and partly to failure of some consumers to distinguish in their reports between gum rosin, wood rosin, and modified or derived rosin. 3/ Calendar year basis prior to crop year beginning April 1, 1937. 4/ Mainly in manufacturing adhesives, plastics, insecticides, disinfectants, linoleum, floor coverings, oils, greases, printing inks, rubber compounding materials, shoe materials, and use in foundry, railroad and shipyard supplies. 5/ Drums of 520 pounds net weight. 6/ Formerly included in "paint, varnish and lacquer." 7/ Includes for first time rosin used in producers' plants in the production of unspecified derived products. Includes (as rosin consumed) the "B wood resin" produced in refining F wood rosin to paler grades. Beginning in October 1950, the "B wood resin" used in making paper size has been excluded. The quantity of "B wood resin" used in making paper size has been small. 8/ Beginning in October, includes (as rosin consumed) "B wood resin" used in making paper size.

Table 6.- Turpentine: Supply and distribution, United States, 1922-50

Year begin- ning April 1	Supply					Distribution			
	Stocks,	Production	Imports	Total	Exports	Stocks,	Reported	Un-	Apparent
	April 1			supply		March 31	industrial	accounted	consumption
				1/			consump- tion 2/	for 1/ 3/	(disappear- ance) 1/ 4/
	1,000 bbl. 5/	1,000 bbl. 5/	1,000 bbl. 5/	1,000 bbl. 5/	1,000 bbl. 5/	1,000 bbl. 5/	1,000 bbl. 5/	1,000 bbl. 5/	1,000 bbl. 5/
1922	85	559	2	646	170	72	174	230	404
1923	72	616	3	692	225	107	134	226	360
1924	107	587	4	697	250	101	135	212	346
1925	101	545	6	652	240	81	143	188	331
1926	81	590	6	677	256	83	112	226	338
1927	83	737	6	826	330	127	117	252	369
1928	127	649	7	783	277	121	106	278	384
1929	121	725	9	854	339	127	112	276	388
1930	127	685	8	820	327	120	101	272	373
1931	120	564	4	688	254	141	87	206	293
1932	141	573	9	724	225	137	62	300	362
1933	137	622	10	769	300	132	67	269	337
1934	132	602	11	745	207	191	69	277	346
1935	191	603	12	807	224	230	88	264	352
1936	230	635	16	881	270	223	105	282	387
1937	223	700	15	939	276	219	108	336	444
1938	219	709	16	944	210	314	93	326	420
1939	314	605	16	936	238	220	111	366	477
1940	220	566	17	803	131	210	114	348	462
1941	210	549	14	772	113	156	146	357	503
1942	156	560	11	728	43	288	105	292	397
1943	288	508	18	814	46	296	187	286	473
1944	296	471	15	782	65	203	190	324	514
1945	203	488	15	706	92	101	164	348	512
1946	101	570	16	687	105	98	140	343	483
1947	98	641	16	755	94	195	141	325	466
1948	195	659	14	868	117	230	104	418	522
1949	230	673	14	917	156	206	112	443	556
1950									
Apr.-									
Dec.	206	567	12	785	171	6/ 160	111	344	455

Compiled from same sources as for table 3.

1/ Computed from unrounded numbers.

2/ Includes turpentine used in producers' plants in production of unclassified derived products.

3/ Chiefly unreported retail sales for use in paints and varnishes.

4/ Total supply, less exports and March 31 stocks.

5/ Barrels of 50 gallons each.

6/ December 31, 1950.

Table 7 .- Turpentine production, annual 1901-50

Year beginning April 1	Total 1/ 1,000 bbls. 2/	Gum 1,000 bbls. 2/	Wood			
			Total 1/ 1,000 bbls. 2/	Steam 1,000 bbls. 2/ distilled	Destructively 1,000 bbls. 2/ distilled	Sulphate 1,000 bbls. 2/
1901	600	600	---	---	---	---
1902	581	581	---	---	---	---
1903	545	545	---	---	---	---
1904	600	600	---	---	---	---
1905	590	590	---	---	---	---
1906	588	588	---	---	---	---
1907	585	585	---	---	---	---
1908	750	750	---	---	---	---
1909	600	600	---	---	---	---
1910	617	615	2	2	---	---
1911	664	660	4	4	---	---
1912	730	715	15	15	---	---
1913	695	675	20	20	---	---
1914	566	560	6	6	---	---
1915	537	530	7	7	---	---
1916	626	610	16	16	---	---
1917	502	474	28	28	---	---
1918	360	340	19	19	---	---
1919	392	367	25	21	5	---
1920	509	489	21	16	5	---
1921	500	486	14	9	5	---
1922	559	520	39	33	5	---
1923	616	565	51	43	8	---
1924	587	521	65	57	8	---
1925	545	478	67	59	8	---
1926	590	510	80	70	9	---
1927	737	650	87	77	10	---
1928	649	560	89	78	9	2
1929	725	626	98	86	10	3
1930	685	599	87	76	6	4
1931	564	500	64	52	5	7
1932	573	501	72	60	5	8
1933	622	526	96	81	6	9
1934	602	510	92	77	6	10
1935	603	497	106	89	5	12
1936	635	483	152	122	7	23
1937	700	518	182	136	7	39
1938	709	534	175	129	5	40
1939	605	383	222	159	7	57
1940	566	344	222	161	7	54
1941	549	285	264	190	9	65
1942	560	322	238	148	6	84
1943	508	288	220	125	4	91
1944	471	245	226	117	4	104
1945	488	244	244	129	5	110
1946	570	270	300	168	5	127
1947	641	294	347	209	4	134
1948	659	324	335	207	3	125
1949	673	323	350	200	3	148
1950 Apr.-Feb.	660	264	396	216	5	175

Compiled from same sources as table 4. 1/ Totals computed from unrounded numbers.
2/ Barrels of 50 gallons each.

Table 8.- Domestic consumption of turpentine by types and major uses, 1922-50

Year begin- ning April 1	Apparent Consumption					Reported Consumption				
	Gum as a:		Un-		Total		Paint, var-		Chemical and	
	Total 1/	percent- age of total	Gum	Wood	account- ed for 1/ 2/	re- ported 3/	nish and lacquer 4/	pharma- ceuticals 5/	All other 1/ 2/	
	1,000 bbl. 6/	Percent	1,000 bbl. 6/	1,000 bbl. 6/	1,000 bbl. 6/	1,000 bbl. 6/	1,000 bbl. 6/	1,000 bbl. 6/	1,000 bbl. 6/	1,000 bbl. 6/
1922	404				230	174	142	8/		32
1923	360				226	134	106	8/		28
1924	347				212	135	107	8/		27
1925	331				188	143	114	2		28
1926	338				226	112	88	1		23
1927	369				252	117	94	8/		22
1928	384				278	106	86	1		19
1929	388				276	112	93	1		19
1930	373				272	101	82	1		18
1931	293				206	87	69	1		17
1932	362				300	62	46	1		15
1933	337				269	67	51	1		15
1934	346				277	69	52	1		17
1935	352				264	88	66	1		20
1936	387				282	105	62	7/22		22
1937	444				336	108	56	31		20
1938	420	66.0	277	143	326	93	51	22		20
1939	477	65.8	314	163	366	111	54	36		22
1940	463	60.3	279	184	348	114	51	40		23
1941	503	55.7	280	223	357	146	64	56		27
1942	397	46.3	184	213	292	105	29	54		22
1943	473	48.8	231	242	286	187	39	122		26
1944	514	59.3	305	209	324	190	35	130		26
1945	512	59.0	302	210	348	164	35	107		22
1946	483	50.9	246	238	343	140	32	91		17
1947	466	42.9	200	265	325	141	32	97		12
1948	522	43.5	227	294	418	104	30	63		11
1949	556	43.2	240	315	443	112	28	76		9
1950										
Apr.-Dec.	455	43.1	196	259	344	111	26	77		7

Compiled from same sources as for table 5.

1/ Computed from unrounded numbers.

2/ Consists mainly of turpentine distributed through retailers for use in paints and varnishes.

3/ Calendar-year basis prior to crop year beginning April, 1937.

4/ Includes use in ester gums and synthetic resins.

5/ Mainly in manufacturing shoe polish and shoe materials and use in railroads and shipyards.

6/ Barrels of 50 gallons each.

7/ Includes for first time turpentine consumed in producers' plants in the production of unclassified derived products.

Table 9.- Prices of gum rosin and turpentine and value of the naval stores unit, 1901-50

Year beginning April 1	Price 1/, Savannah, Georgia			Value		Percent of unit value	
	Turpentine, Rosin, 100 pounds net,			Turpentine, Rosin,		Naval stores	
	per gallon : in drums			50 gallons : 1,400 pounds:		unit	
	in bulk	K grade	All grades	2/		Turpentine	Rosin
	Dollars	Dollars	Dollars	Dollars	Dollars	Percent	Percent
1901	.283	.61	---	14.15	8.54	62	38
1902	.414	.74	---	20.70	10.36	67	33
1903	.454	1.05	---	22.70	14.70	61	39
1904	.465	1.30	---	23.25	18.20	56	44
1905	.570	1.83	---	28.50	25.62	53	47
1906	.556	1.96	---	27.80	27.44	50	50
1907	.490	1.93	---	24.50	27.02	48	52
1908	.331	1.46	---	16.55	20.44	45	55
1909	.423	2.24	---	21.15	31.36	40	60
1910	.617	2.61	---	30.85	36.54	46	54
1911	.481	2.97	---	24.05	41.58	37	63
1912	.359	3.00	---	17.95	42.00	30	70
1913	.327	1.96	---	16.35	27.44	37	63
1914	.388	1.83	---	19.40	25.62	43	57
1915	.370	1.76	---	18.50	24.64	43	57
1916	.370	2.54	---	18.50	35.56	34	66
1917	.358	2.58	---	17.90	36.12	33	67
1918	.508	4.92	---	25.40	68.88	27	73
1919	1.212	7.49	---	60.60	104.86	37	63
1920	1.393	6.07	---	69.65	84.98	45	55
1921	.566	1.93	1.83	28.31	25.62	52	48
1922	1.138	2.23	2.26	56.91	31.64	64	36
1923	.892	2.04	2.03	44.61	28.42	61	39
1924	.753	2.28	2.44	37.65	34.16	52	48
1925	.997	4.72	4.83	45.33	67.62	40	60
1926	.766	5.49	5.30	38.31	74.20	34	66
1927	.454	3.62	3.63	22.69	50.82	31	69
1928	.445	3.56	3.60	22.27	50.40	31	69
1929	.423	3.23	3.28	21.14	45.92	32	68
1930	.333	2.17	2.18	16.67	30.52	35	65
1931	.341	1.67	1.69	17.05	23.66	42	58
1932	.328	1.26	1.23	16.41	17.22	49	51
1933	.367	1.64	1.69	18.36	23.66	44	56
1934	.396	1.98	1.98	19.82	27.72	42	58
1935	.376	1.90	1.97	18.78	27.58	41	59
1936	.315	2.58	2.79	15.74	39.06	29	71
1937	.254	3.25	3.20	12.68	44.80	22	78
1938	.166	2.00	2.18	8.30	30.52	21	79
1939	.193	2.27	2.37	9.65	33.18	23	77
1940	.240	1.79	1.98	12.02	27.72	30	70
1941	.527	2.33	2.42	26.35	33.88	44	56
1942	.591	3.21	3.22	29.55	45.08	40	60
1943	.679	3.97	3.97	33.95	55.58	38	62
1944	.779	5.50	5.61	38.95	78.54	33	67
1945	.791	6.28	6.50	39.55	91.00	30	70
1946	.967	7.30	7.43	48.35	104.02	32	68
1947	.627	7.74	7.83	31.35	109.62	22	78
1948	.428	7.32	7.39	21.40	103.46	17	83
1949	.384	6.41	6.47	19.20	90.58	17	83
1950 3/	.551	6.25	6.31	27.55	88.34	24	76

Sources: 1901-20, Gamble's International Yearbook, 1921. Rosin prices for K grade in 1901-08 estimated from G grade as published by Gamble. 1921-50, K grade rosin from Naval Stores Review, weekly. Rosin (all grades) and turpentine from the 1943, 1946, 1947 and 1949 annual naval stores reports of the U. S. Department of Agriculture. Rosin prices in 1921-29 converted from barrels of 280 pounds gross weight (230 pound net). Six cents subtracted from turpentine prices as quoted in 1921-40 to eliminate cost of package.

1/ Weighted.

2/ Basis K grade 1901-20; all grades 1921-50.

3/ Preliminary.

Table 10.- Gum rosin, turpentine and the naval stores unit: Savannah Market, parity and support prices and CCC stocks, 1934-51

Year beginning April 1	K Rosin										Turpentine										Naval stores unit																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
	Price per 100 pounds, net					Percent-					Price per gallon, bulk					Percent-					Value					Parity					Net loan rate 1/ is of parity 2/ Percent																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 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3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market	Parity	Net	loan	age	CCC beginning stocks 3/	Market

Based on data obtained from the Naval Stores Division, Production and Marketing Administration, U. S. Department of Agriculture.

1/ In 1942 through 1944, purchase programs as well as loan programs were available to gum producers. In 1942, parity for the loan program is as of November 29, 1941. In July 1942, a purchase program was initiated with parity for the 1942 crop based on June 1, 1942.

L - indicates loan program; P - indicates purchase program.

2/ Loan programs prior to 1942 were not based upon parity.

3/ Prior to 1947, stocks as of 15th of March. Beginning in 1947, stocks as of April 1.

4/ Drums of 520 pounds net weight.

5/ Barrels of 50 gallons each.

6/ No program.

7/ Weighted average. Loan rate from April through July was 1.97 dollars. Rate was advanced to 2.47 dollars August 1 in response to demands to offset increasing costs.

8/ Based on 1,348 pounds of rosin instead of 1,400 pounds.

9/ Weighted average. Initially, the loan rates were set at 7.09 dollars for rosin and 64.5 cents for turpentine. As turpentine was not moving readily into consumption at that price, effective June 8, 1948 the support for turpentine was reduced to 40 cents. In order to keep the unit support price unchanged, the support for rosin was increased to 7.97 dollars.

10/ Preliminary.

11/ All grades.

12/ Ninety percent of the parity price of crude pine gum as computed April 1, 1951. Although the support level for the naval stores unit will remain the same throughout the loan period, individual loan rates applied to turpentine and rosin may be revised from time to time as conditions justify. Beginning in December 1950, the computation of the parity price for crude pine gum has been substituted for the computation of parity prices of gum rosin and gum turpentine.

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